

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (original): A lithography mask blank used as a material for manufacturing a lithography mask and comprising at least one layer of a thin film having a required function and formed on a substrate, comprising:

a nitrogen-containing thin film as said thin film, and

an ammonium ion production preventing layer for preventing production of ammonium ions, which is formed on said nitrogen-containing thin film or at least at a surface portion of said nitrogen-containing thin film and which is exposed on the surface of said lithography mask after said lithography mask is manufactured.

2. (original): A lithography mask blank according to claim 1, wherein:
said ammonium ion production preventing layer is a thin film containing less nitrogen than said nitrogen-containing thin film.

3. (canceled).

4. (currently amended): ~~A photomask, wherein:
the photomask is manufactured using said lithography mask blank according to any of claims 1 to 3~~

A lithography mask comprising:

a substrate,

a nitrogen-containing thin film formed on said substrate, and

an ammonium ion production preventing layer for preventing production of ammonium ions, which is formed on said nitrogen-containing thin film or at least at a surface portion of said nitrogen-containing thin film and which is exposed on the surface of said lithography mask after said lithography mask is manufactured,

said nitrogen-containing thin film and said ammonium ion production preventing layer being provided with a predetermined pattern.

5. (original): A halftone phase shift mask blank used as a material for manufacturing a halftone phase shift mask and comprising at least a light-semitransmissive film composed of one layer or multilayers, having a required transmittance and phase shift amount, and formed on a substrate, comprising:

a nitrogen-containing thin film as a thin film forming said light-semitransmissive film,
and

an ammonium ion production preventing layer for preventing production of ammonium ions, which is formed on said nitrogen-containing thin film or at least at a surface portion of said nitrogen-containing thin film and which is exposed on the surface of said mask after said mask is manufactured.

6. (original): A halftone phase shift mask blank according to claim 5, wherein:
said ammonium ion production preventing layer is a thin film containing less nitrogen than said nitrogen-containing thin film.

7. (original): A halftone phase shift mask blank according to claim 6, wherein:
said nitrogen-containing thin film contains at least silicon and nitrogen and
said ammonium ion production preventing layer contains at least silicon and oxygen.

8. (canceled).

9. (currently amended): ~~A halftone phase shift mask, wherein:
said halftone phase shift mask is manufactured using said halftone phase shift mask blank
according to any of claims 5 to 8~~

A halftone phase shift mask comprising:
a substrate, and
a light-semitransmissive film composed of one layer or multilayers, having a required transmittance and phase shift amount, and formed on said substrate,
said light-semitransmissive film comprising:
a nitrogen-containing thin film formed on said substrate, and
an ammonium ion production preventing layer for preventing production of ammonium ions, which is formed on said nitrogen-containing thin film or at least at a surface portion of said nitrogen-containing thin film and which is exposed on the surface of said mask after said mask is

manufactured,

said nitrogen-containing thin film and said ammonium ion production preventing layer being provided with a predetermined pattern.

10. (new): A lithography mask blank according to claim 1, wherein:
said ammonium ion production preventing layer has film thickness thinner than said nitrogen-containing thin film.

11. (new): A lithography mask blank according to claim 1, wherein:
said ammonium ion production preventing layer contains a metal.

12. (new): A lithography mask blank according to claim 1, wherein:
said ammonium ion production preventing layer has a chemically stable state in film structure relative to said nitrogen-containing thin film.

13. (new): A lithography mask blank according to claim 1, wherein:
said ammonium ion production preventing layer is an oxide of said nitrogen-containing thin film.

14. (new): A lithography mask blank according to claim 1, wherein:
said nitrogen-containing thin film further contains silicon and molybdenum, and said ammonium ion production preventing layer is an oxide of said nitrogen-containing thin film.

15. (new): A lithography mask blank according to claim 1, wherein:
a concentration of said ammonium ion is $20\text{ng}/\text{cm}^2$ or less.

16. (new): A lithography mask blank according to claim 1, wherein:
an exposure light source to the lithography mask is a KrF excimer laser or an ArF excimer laser.

17. (new): A halftone phase shift mask blank according to claim 5, wherein:
said ammonium ion production preventing layer has film thickness thinner than said nitrogen-containing thin film.

18. (new): A halftone phase shift mask blank according to claim 5, wherein:
said ammonium ion production preventing layer contains a metal.

19. (new): A halftone phase shift mask blank according to claim 5, wherein:
said ammonium ion production preventing layer has a chemically stable state in film structure relative to said nitrogen-containing thin film.

20. (new): A halftone phase shift mask blank according to claim 5, wherein:
said ammonium ion production preventing layer is an oxide of said nitrogen-containing thin film.

21. (new): A halftone phase shift mask blank according to claim 5, wherein:
said nitrogen-containing thin film further contains silicon and molybdenum, and said ammonium ion production preventing layer is an oxide of said nitrogen-containing thin film.

22. (new): A halftone phase shift mask blank according to claim 5, wherein:
a concentration of said ammonium ion is $20\text{ng}/\text{cm}^2$ or less.

23. (new): A halftone phase shift mask blank according to claim 5, wherein:
an exposure light source to the lithography mask is a KrF excimer laser or an ArF excimer laser.

24. (new): A halftone phase shift mask blank used as a material for manufacturing a halftone phase shift mask and comprising:

a substrate,

a light-semitransmissive film having a required transmittance and phase shift amount and containing a metal, silicon and nitrogen, and formed on a substrate, and

an ammonium ion production preventing layer for preventing production of ammonium ions, which is an oxide of said light-semitransmissive film, formed at a surface portion of said light-semitransmissive film and which is exposed on the surface of said mask after said mask is manufactured.

25. (new): A method of manufacturing a halftone phase shift mask blank used as a material for manufacturing a halftone phase shift mask, comprising the steps of:

forming a light-semitransmissive film on a substrate, which has a required transmittance and phase shift amount and which contains a nitrogen, and

forming, by carrying out heat treatment to said light-semitransmissive film, an ammonium ion production preventing layer at a surface portion of said light-semitransmissive film, which prevents production of ammonium ions and which is exposed on the surface of said

mask after said mask is manufactured.

26. (new): A method of manufacturing a halftone phase shift mask blank according to claim 25, wherein:

said light-semitransmissive film further contains silicon and molybdenum.

27. (new): A method of manufacturing a halftone phase shift mask blank according to claim 25, wherein:

said heat treatment of the light-semitransmissive film is carried out in atmosphere containing oxygen.

28. (new): A method of manufacturing a halftone phase shift mask blank according to claim 25, wherein:

said heat treatment of the light-semitransmissive film is carried out so that a concentration of said ammonium ion becomes $20\text{ng}/\text{cm}^2$ or less.

29. (new): A method of manufacturing a halftone phase shift mask blank according to claim 25, wherein:

a time of said heat treatment is set so that production of ammonium ions which are exposed on the surface of said mask after said mask is manufactured is prevented.

30. (new): A method of manufacturing a halftone phase shift mask blank according to claim 25, wherein:

said heat treatment of the light-semitransmissive film is carried out so that said phase shift amount no change.